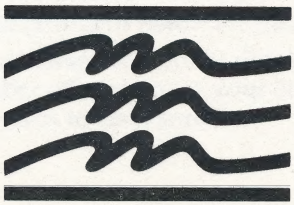
TEACHER'S GUIDE

Dinosaur Dig™



MINDSCAPE INC

INTRODUCTION

DINOSAUR DIG captures students' imagination and interest as it provides a wealth of information about these prehistoric animals, rulers of the continents for more than 100 million years.

Part 1 of DINOSAUR DIG is an animated, interactive electronic "book." The student reads "pages" that contain both text and graphics. Each of the pages covers one topic concerning dinosaurs, for example, their eating habits, their bone structure, and family groups. Animated graphics illustrate many aspects of dinosaur life, and the text encourages a better understanding of how dinosaurs lived and why they disappeared 65 million years ago.

Part 2 of DINOSAUR DIG consists of five learning games and activities. These games use the facts about the program's 32 dinosaurs, found in *Dino Discovery*, one of the games.

The Program Guide that accompanies DINOSAUR DIG shows the students how to set up his or her computer and how to use and take care of the accompanying EasyKey keyboard overlay. It also provides additional information about the program, interesting dinosaur lore, and a bibliography.

The activities in this Teacher's Guide suggest a variety of ways to use this data base in the classroom. They show that DINOSAUR DIG offers many teaching opportunities as a computer program and that it can help students in the study of earth history, in vocabulary building, in general science, and more. Paleontologists have come to see dinosaurs as important extinct animals from which much can be learned. DINOSAUR DIG can provide a special introduction to this vast body of fascinating knowledge.

CLASSROOM ACTIVITIES

Dino by Dino

Learning Objective:
To help the students classify the information found in the data base and retain the facts more easily

1. The software depicts 32 dinosaurs. Depending on the number of students in your class, assign one or two dinosaurs to each student.

2. Have the students list the information found in *Dino Discovery* on individual index cards or posters. This information would include the length and weight of the dinosaurs, higher group, lower group, diet, time period, continents where dinosaur fossils were found, the meaning of the dinosaur name, the pronunciation of the name, and body structure.
3. With the students, make charts of the dinosaurs and their characteristics. Charts would be labeled, for example, Diet (with the names of herbivores, carnosaurs, etc.); Triassic Period (with the names of the dinosaurs who lived then); Weights (from heaviest to lightest of the dinosaurs), and so on. Students can consult their index cards to contribute information to the charts.
4. When students have listed the 32 dinosaurs in these various categories, they will be able to see the relationships among them more clearly.
5. Here are examples of questions you then might ask:

By Period: In the Triassic Period, which animal was found on the greatest number of continents?

The condontosaurus.

By Body Structure: Are all bird-hipped dinosaurs herbivores?

No. Which are carnosaurs?

By Statistical Classification: There is only one dinosaur shown for the Lower Jurassic Period. Which one is it?

Scelidosaurus.

What's My Dinosaur Name?

Learning Objective:
To encourage the students to learn the characteristics of each dinosaur in the program so they can undertake the activities on the software with more confidence. They will be able to draw conclusions and make deductions rather than use only memorization.

1. The students take turns "being" one of the dinosaurs listed on the EasyKey. Other students must guess who they are. To start, they can offer any characteristic as a clue; for example, "I live in the Upper Cretaceous Period." Only one guess by other students is allowed before the next characteristic is given; for example, "I am a herbivore." Again, only one guess may be offered.

2. The game continues until a student guesses the name of the dinosaur.
3. The winner should provide any missing characteristics of the dinosaur that have not already been mentioned.

Dinosaur Teams TIME PERIOD

Learning Objective:

To sort the information provided about dinosaurs so that the students can see the relationship between dinosaurs and their time periods

1. Depending on the number of students in your class, have each one choose to be a dinosaur on the EasyKey. Divide the classroom into time periods. Then ask each "dinosaur" to go to the part of the room that is designated the Triassic Period, Upper Jurassic Period, and so on.
2. When they are in these time period groups, ask each "dinosaur" to identify itself. Which dinosaurs are older? Which lived more than millions of years ago? How many millions of years ago was each period?

Dinosaur Diets

Learning Objective:

To sort the information about dinosaurs so that the students can see the relationship between the dinosaurs and their diets

1. Use the same method that you used with time periods. Have students sort themselves into herbivores, carnosaurs, insectivores, and omnivores. They will see which group has the greatest number in the program.
2. Have the students state their dinosaurs' lengths and weights. Then draw some conclusions about carnosaurs vs. herbivores in size.
3. Ask one or two students to research how scientists can tell what kind of food dinosaurs ate. *The Illustrated Dinosaur Dictionary* (see the bibliography in the Program Guide) describes the kinds of teeth different dinosaurs had. (Plant-eating hadrosaurs, for example, had no teeth in front, but some had as many as 280 on each side of the upper and lower jaw—1,120 teeth altogether.)

Dinosaur Fossils

Learning Objective:

To show the students where most of the dinosaur fossils were found by "sorting" them into the various continents

1. Again, each student becomes a dinosaur. Each "dinosaur" moves to that part of the classroom that is designated as Africa, North America, and so on.
2. Which of the continents where dinosaur remains were found now has the most inhabitants?
3. Dinosaurs who were found in more than one continent could roam to another continent, demonstrating how the earth's surface was different millions of years ago. Have students describe the differences. (See E. Colbert's *Dinosaurs* in the bibliography for representations of continental evolution.)

Charting the Mesozoic Era

Learning Objective:
To show the students the years of each time period so that they can see the relationship of the years in the "Age of Reptiles"

1. Construct a classroom chart on the bulletin board, and have the students place the time periods of the Mesozoic Era in order. (See the Program Guide.)
2. Have the students do research on which kinds of dinosaurs lived in each period and where most of them were found. The students' research should also include the climatic and earth changes that occurred.
3. Use the bibliography in the Program Guide to research other dinosaurs not mentioned on the EasyKey. (Paleontologists have identified at least 50 new kinds of dinosaurs since 1970.)

Bigger than a Bread Basket?

Learning Objective:
To have the students visualize a given length or weight of a dinosaur

1. Make a chart comparing the weights and lengths of the dinosaurs listed on the EasyKey. (Others may be added.)
2. Add to the chart examples of everyday objects that students know, for example, a tree, flagpole, fire truck, elephant.
3. Have the students research several categories in the *Guinness Book of World Records*, such as the largest mammal, the bird with the largest wing span. Compare these to the dinosaurs on the chart. The students can compare the largest living carnivore, the Kodiak bear, to what was thought to be the largest carnosaur, *Tyrannosaurus Rex*.

Dinosaur Family Tree

Learning Objective:
To show the students the relationship between dinosaurs and other reptiles and also their relationship to each other according to higher groups (orders) and lower groups (suborders)

1. Have students draw the family tree of dinosaurs, as shown in Part 1 of the program.
2. Using the classifications found in *Dino Discovery*, place each dinosaur or reptile on the EasyKey on the family tree. Analyze their relationships.
3. Have the students draw their own family tree, showing family ancestral names and descendants.

Dinosaur Maps

Learning Objective:
To show the students the principal localities where fossils of dinosaurs have been found

1. Give students copies of maps of the world. Choosing one color for each of the five time periods of the Mesozoic Era, have them place colored dots on the different continents.
2. Ask students to research other migrations of animals and birds. Have them draw maps to show these migrations.

Dinosaur World

Learning Objective:
To have the students learn more about the dinosaurs' environment and how they lived

1. Ask the students to make reports on aspects of the dinosaur world, for example, the geography, the climate, the weather.
2. When the reports are read in class, have the students draw conclusions about the entire dinosaur environment.
3. What areas of the world are now similar in climate? In vegetation?

Animal Tracks

Learning Objective:
To show the students that dinosaurs left traces of their travels and habits just as animals do today

1. Plan to take students on a trip early in the morning to detect animal tracks in the snow or the mud. (You may have better ways to find them.)

2. Explain that fossils are the tracks or traces of past life preserved in rocks. From these remains, scientists have learned where and how dinosaurs lived, if they walked on four legs or on two, what they ate, if they laid eggs, and much more.
3. What conclusions can the students draw from the animal tracks they have seen?
4. See the Program Guide to learn more about important sites of dinosaur tracks.

Birds, or Dinosaurs?

Learning Objective:

To show the students that paleontologists have drawn conclusions from fossil remains that link dinosaurs to birds

1. Have your students do research on archaeopteryx. They will discover that fossil imprints show feathers, which make archaeopteryx a bird. What more is to be learned?
2. See the Program Guide for more on this controversy.

Extinction

Learning Objective:

To make the students aware of the mystery of the extinction of the dinosaurs and to show them the need to examine the possibilities of other extinctions

1. Dinosaurs, as well as half of the other plant and animal species that have ever existed, became extinct about 65 million years ago. No one knows exactly why this happened. But this event opened the way for the rise of mammals. Have students research the topic and report on some of the newest theories, including that of a global fire. They could draw pictures to illustrate the theories. Also, see the Program Guide and Disk 1 of the program for some possibilities.
2. Are there animals or birds living today that might become extinct? Have students research which species are endangered and what scientists are doing to ensure their preservation.

   Have your students discuss the threat of nuclear warfare and extinction of species.

Live Dinosaurs

Learning Objective:

The show the student that prehistoric creatures, though extinct for 65 million years, still fascinate humans

1. In May 1986, a working model of a pterosaur was designed for the Smithsonian Institution's Air and Space Museum. The plastic replica of the flying reptile took a nose dive and crashed in its first public demonstration. Fossils found 14 years ago in West Texas prove the pterosaur grew to a wingspan of 36 feet with a large head, a slender beak, a long neck, and no tail—a shape that almost defied flight. The pterosaur may have been a giant, reptilian version of a modern vulture.
2. Using the model in item 1, have students research articles in newspapers and magazines that show that "history is alive" today.

The Truth about Dinosaurs

Learning Objective:
To show the students that people often have misconceptions about animals, places, times, and so on, and that research can correct those errors in thinking

1. Ask students to state some of the theories they have always had about dinosaurs. Perhaps they thought that all dinosaurs walked on four feet or that they lived about 200 years ago.
2. Then have the students correct their ideas and impressions, using evidence they have found in this program and in their research.

Word Derivations

Learning Objective:
To help students build their vocabulary and understand the meanings of words

1. Have the students select several dinosaurs' names and then look up the meaning of each part, focusing primarily on the suffix and prefix. Most, though not all, of the names are derived from Greek.
2. Ask students to compare their dictionary findings with the meaning of names as shown on the software. Have them think up words with the same prefixes or suffixes.

EXAMPLE 1:

ARCHAEOPTERYX (the oldest bird known, of Upper Jurassic age)

archaeo . . . . ancient
pteryx . . . . . wing

Archaeology . . . . the scientific study of material remains of past human life and activities, such as fossils, relics, and so on.

EXAMPLE 2:

IGUANODON (A Lower Cretaceous ornithopod)

iguana . . . . a large American lizard
odon . . . . . tooth

Orthodontist . . . . your students will know what this means. Incidentally, *orthos* is the Greek word for "straight."

EXAMPLE 3:

QUADRUPED, BIPED

Have students look up these words and identify which dinosaurs on the EasyKey were quadrupeds and which were bipedal. Discuss the word derivations.

The Fossil Hunt

Learning Objective:
To encourage the students to use imagination and create fiction with the facts they have learned about dinosaurs

1. Have students use *DINO DISCOVERY* to check the facts in the "Adventures of Oklahoma Brown" found on page 8. You may choose to use the story as it is, changing the italicized words or phrase as that set of data is verified. Or you may use it as a model to stimulate your students' imaginations. If you use the story as a model, take either an individual or a team approach.
2. Individual Approach: Have each student write an adventure in which he or she underlines the data to be verified. Correct answers should be kept on a separate sheet of paper. Each student will then pass his or her story to another student to be verified.
3. Team Approach: Divide the class into several teams. Ask each team to create a story, perhaps even acting out the scene. The other team then has to spot the errors.

Students or teams can collect hatched dinosaur eggs for every error spotted and corrected.

THE ADVENTURES OF OKLAHOMA BROWN

It was a cold, bitter winter's day. The snow and ice hit Oklahoma's face as she plodded across the plateaus of *the western United States*. Oklahoma Brown, the famous *paleontologist*, and her assistant chimp, Genji, were trying to find fossils of the notorious *ankylosaurus*—known to have roamed this part of the globe during the *Upper Cretaceous* period.

For almost two months the two had been searching for the dig left by the eccentric Professor S. Cadet. He had abandoned the site, but not before he'd hinted to Oklahoma that he'd made a magnificent find.

All at once Genji pointed and shouted.

"This is terrible!" exclaimed Oklahoma. "Someone's beat us to it! What's worse, I think that someone is that unscrupulous explorer and paleontologist, Rhett Valet!"

And it was indeed. Rhett spotted them and waved for them to come forward. "Oklahoma, it's great to see you. Look what I've found."

Oklahoma and Genji joined Rhett, who was examining the site of a deep excavation. "There are some great fossil relics here," said Rhett."Look. You can see three distinct layers representing different time periods. In this top layer, I think I've found a footprint from a *pachycephalosaurus*."

"Doesn't that look like the front paw, Oklahoma?" Rhett asked. "It must represent the *Upper Cretaceous*. I haven't found any fossils from the *Lower Cretaceous*, but, in the layer just below, which would represent the *Upper Jurassic*, I found a piece of fossilized bone. I'm sure it's a *kentrosaurus*, particularly because I found that bone next to another very different one, maybe of its prey. What do you think, Oklahoma?"

If you were Oklahoma Brown, how would you respond to Rhett Valet? Do you see any errors in Rhett's conversation? Would you agree with him about the identity of the bone? Do you think he correctly identified the footprint he found? Was Oklahoma searching in the right location for signs of the *ankylosaurus*?

RESPONSES:

The bone was not that of *kentrosaurus* because its remains were found in northern Africa, not in North America. (It did live in the *Upper Jurassic* period.) In addition, *kentrosaurus* was a *herbivore*; therefore, the other bone that was found would not have been its prey.

The footprint Rhett found was probably not that of a *pachycephalosaurus* because that was a bird-hipped dinosaur that had small front paws and walked on its hind legs. The footprint was more likely to be that of a dinosaur that had walked on all fours.

Oklahoma's search for *ankylosaurus* in that part of the world was appropriate.

Game Varaiations (See Program Guide also)

Dino Discovery Each team begins with one dozen dinosaur eggs (use pennies or chips). The "dig" is the storage area (similar to a bank in some games) for hatched dinosaur eggs. The first team selects a characteristic, that is, "bird-hipped" or "lived in *Triassic Period*." The other team must choose the computer key that represents a dinosaur or reptile that shares that characteristic. Wrong guesses mean forfeiting a dinosaur egg to the bank. Correct guesses mean gaining a dinosaur egg from the other dig.

Dino Flash For this version, you need a bell and a timer. Teams are chosen, and a member from each team stands or sits in front of the computer positioned with a bell. When the students think they can recognize the dinosaur on the screen, they ring the bell. If the given answer is incorrect, the other team has a chance to offer an answer. If both answers are wrong, the timekeeper presses the EasyKey for another clue.

Further challenges to this game-show version may be added by creating a time limit for guessing each clue. The person who is the timekeeper will then press the EasyKey for the next clue if no one rings the bell during the allotted time. The more clues required for selecting the right answer will result in fewer points being awarded.

EXCEPTIONAL STUDENTS

CBS Software recently underwrote a study in Chicago-area schools to see how specific student populations, i.e., learning-disabled, slow-learners, and gifted students, responded to our software. DINOSAUR DIG™ was one of several programs tested which may be beneficial in use with exceptional students. For more information on these findings, write: CBS Interactive Learning, 1-800-CBS-ASK4. (not work 9-17-90)

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